



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,250	03/12/2004	Arne C. Benson	FSI0135/US	8204
7590		08/02/2007		
Paul John Parins				
Kagan Binder, PLLC				
Maple Island Building				
221 Main Street North, Suite 200				
Stillwater, MN 55082				
			EXAMINER	
			RIVELL, JOHN A	
			ART UNIT	PAPER NUMBER
			3753	
			MAIL DATE	DELIVERY MODE
			08/02/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/799,250

Applicant(s)

BENSON ET AL.

Examiner

John Rivell

Art Unit

3753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 5/29/07 (RCE).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3,5,7,10-13,15,16,18 and 21-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24 is/are allowed.
- 6) ☒ Claim(s) 1,3,5,7,10-13,15,16,18 and 21-23 is/are rejected.
- 7) ☒ Claim(s) 25 and 26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 22, 2007 has been entered.

In order to clarify the record, the Examiner apologizes for the clerical error in the Final Office action of February 26, 2007. Specifically, on page 13 of the written action, the indication of claim 23 as being otherwise allowable should have read claim 24 as indicated on the cover letter. The Examiner regrets any delay caused by such error. This error was communicated to applicant in an applicant initiated telephone interview of March 22, 2007.

In light of the response of May 22, 2007 being entered as per the RCE filing, claims 2, 4, 6, 8, 9, 14, 17, 19 and 20 have been canceled. New claims 25-26 have been added. Thus claims 1, 3, 5, 7, 10-13, 15, 16, 18 and 21-26 are pending.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each

Art Unit: 3753

claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 5, 11-13, 16 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miwa et al (U. S. Pat. No. 5,058,927 of record) in view of Jen (U. S. Pat. No. 4,455,121 of record).

The patent to Miwa, in figure 4 for example, discloses a "rotary union, comprising: a housing (1', 3') having a fluid path (14) through which a fluid can be conveyed through the housing; a rotor (12) having a fluid path (11) through which a fluid can be conveyed through the rotor, wherein the rotor (12) is rotatably coupled to the housing (1' 3'); at least a first (7) and a second (8)... bearing interposed between a portion of the rotor (12) exterior and a portion of the housing (1', 3') interior, wherein the first (7) and second (8) bearings are spaced apart and rotatably couple the rotor (12) and the housing (1', 3'); a post (read at the extreme right end of rotor 12 shaft 10') having a fluid path (at 11) through which a fluid can be conveyed through the post, said post being positioned in the rotary union in a manner effective to help fluidly couple the rotor fluid path (11) and the housing fluid path (14) such that a fluid can be transferred between the housing (1', 3') and the rotor (12) via the post fluid path; and an annular gap (23') surrounding at least a portion of the post, wherein the annular gap (23') constitutes at least a portion of a drain pathway (to drain port 26') through which a portion of fluid conveyed through the housing fluid path is drained from the rotary union" as recited in claim 1.

Thus the patent to Miwa discloses all the claimed features with the exception of having an "unlubricated" bearing element(s).

The patent to Jen discloses that it is known in the art to employ unlubricated bearings 56, made of ceramic material, for the purpose of simplifying the system

Art Unit: 3753

requirements by utilizing bearing elements that require no lubrication and thus will not fail upon lubrication failure. Additionally, any lubricant that would otherwise have entered the fluid conducted through the system simply because of its presence, will not now be a factor in utilizing unlubricated bearings as lubrication is not present.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Miwa unlubricated bearing elements for the purpose of utilizing bearing elements that require no lubrication and thus will not fail upon lubrication failure as recognized by Jen. Additionally, any lubricant that would otherwise have entered the fluid conducted through the system simply because of its presence, will not now be a factor in utilizing unlubricated bearings as lubrication is not present.

Regarding claim 5, the patent to Miwa, in figure 4 for example, a "rotary union, comprising: a housing (1' 3') having a base portion (read at for example 3'); a rotor (12) having a first end (the extreme right end of rotor 12) positioned at least partially in the housing (1', 3') interior, wherein the rotor (12) is rotatably coupled to the housing (1', 3'); at least a first (7) and a second (8)... bearing interposed between a portion of the rotor (12) exterior and a portion of the housing (1', 3') interior, wherein the first (7) and second (8) bearings are spaced apart and rotatably couple the rotor (12) and the housing (1', 3'); a post (read at the extreme right end of rotor 12 shaft 10') that extends from the (rotor 12)... at least partially into a chamber (at bore 21') in the (housing 3'), said chamber (21') being oversized relative to the post such that an annular gap (23') extends along a length of the post between the post and the (housing 3'); a first fluid port (14) associated with the housing (1', 3') through which a fluid can exit or enter the rotary union; a second fluid port (11) associated with the rotor (12) through which a fluid can exit or enter the rotary union; a fluid pathway (from 14 to 11) extending through the

Art Unit: 3753

rotary union at least between the first and second fluid ports, said fluid pathway comprising first and second pathway portions, wherein the first pathway portion extends through the post, the second pathway portion extends through the rotor (12), and wherein the first pathway portion is in fluid communication with the second pathway portion via a juncture inside the (housing) chamber (21'); and a drain pathway (to drain port 26') having an inlet (25') inside the (housing) chamber (21') proximal to said juncture, wherein the annular gap (23') between the post and the (housing 1', 3') constitutes at least a portion of the drain pathway" as recited.

Thus the patent to Miwa discloses all the claimed features with the exception of having an "unlubricated" bearing element and physically locating the "post" on the housing extending into a "chamber" in the "rotor. Rather, as in Miwa, the "post" extends from the rotor into a chamber in the housing. That is, the physical locations are reversed.

Firstly, the patent to Jen discloses that it is known in the art to employ unlubricated bearings 56, made of ceramic material, for the purpose of simplifying the system requirements by utilizing bearing elements that require no lubrication and thus will not fail upon lubrication failure. Additionally, any lubricant that would otherwise have entered the fluid conducted through the system simply because of its presence, will not now be a factor in utilizing unlubricated bearings as lubrication is not present.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Miwa unlubricated bearing elements for the purpose of utilizing bearing elements that require no lubrication and thus will not fail upon lubrication failure as recognized by Jen. Additionally, any lubricant that would otherwise have enter the fluid conducted through the system simply because of its

presence, will not now be a factor in utilizing unlubricated bearings as lubrication is not present.

Secondly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to physically reverse the location of the "post" and "chamber" of Miwa such that the "post" extends from the housing 1', 3' into a chamber formed in the rotor 12, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. In re Einstein, 8 USPQ 167. Such a physical reversal of the location of the essential working parts of the device of Miwa will naturally include the presence of a drain conduit as at 26' in Miwa.

Regarding claim 11, in Miwa, as disclosed, utility is in a "fluid delivery system comprising the rotary union of claim 5, comprising: a source of fluid (attached to inlet 13), wherein the first fluid port (14) is fluidly coupled to the source of fluid; and a rotating point of use (at rotor 12), wherein the second fluid port (11) is fluidly coupled to the rotating point of use" as recited.

Regarding claim 12, in making and/or using the device disclosed in Miwa, one necessarily performs a "method of using the rotary union of claim 5, comprising: fluidly coupling the first fluid port (14) to a source of process fluid; fluidly coupling the second fluid port (11) to a rotational point of use; and transferring process fluid from the source of process fluid to the rotating point of use, wherein during the entire time period that the process fluid is being transferred to the rotating point of use a portion (e.g. that portion which leaks through gap 23') of the process fluid transferred into the rotary union is continuously drained (to drain port 26') from the rotary union through the drain pathway (26')" as recited.

Regarding claim 13, the patent to Miwa, in figure 4 for example, discloses a "rotary union, comprising: a housing (1',3'); a rotor (12) having a first (extreme right)

end positioned at least partially in the housing (1', 3') interior, wherein the rotor (12) is rotatably coupled to the housing (1', 3'); at least a first (7) and a second (8)... bearing interposed between a portion of the rotor (12) exterior and a portion of the housing (1', 3') interior, wherein the first (7) and second (8) bearings are spaced apart and rotatably couple the rotor (12) and the housing (1', 3'); a post (the extreme right end of rotor 12) that extends from the first end of the rotor (12) at least partially into a chamber (21') in the housing (1', 3'), said chamber (21') being oversized relative to the post such that an annular gap (23') extends along a length of the post between the post and the housing (1', 3'); a first fluid port (14) associated with the housing (1', 3') through which a fluid can exit or enter the rotary union; a second fluid port (11) associated with the rotor (12) through which a fluid can exit or enter the rotary union; a fluid pathway extending through the rotary union at least between the first and second fluid ports, said fluid pathway comprising first and second pathway portions, wherein the first pathway portion extends through the housing (1, 3'), the second pathway portion extends through the post, and wherein the first pathway portion is in fluid communication with the second pathway portion via a juncture inside the housing chamber; and a drain pathway (to drain port 26') having an inlet (at 25') inside the housing chamber (21') proximal to said juncture, wherein the annular gap (23') between the post and the housing (1', 3') constitutes at least a portion of the drain pathway" as recited.

Thus the patent to Miwa discloses all the claimed features with the exception of having an "unlubricated" bearing element.

The patent to Jen discloses that it is known in the art to employ unlubricated bearings 56, made of ceramic material, for the purpose of simplifying the system requirements by utilizing bearing elements that require no lubrication and thus will not fail upon lubrication failure. Additionally, any lubricant that would otherwise have



entered the fluid conducted through the system simply because of its presence, will not now be a factor in utilizing unlubricated bearings as lubrication is not present.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Miwa unlubricated bearing elements for the purpose of utilizing bearing elements that require no lubrication and thus will not fail upon lubrication failure as recognized by Jen. Additionally, any lubricant that would otherwise have entered the fluid conducted through the system simply because of its presence, will not now be a factor in utilizing unlubricated bearings as lubrication is not present.

Regarding claim 16, in making and/or using the device disclosed by Miwa in figure 4 for example, one necessarily performs a "method of making a rotary union comprising: providing: a housing (1', 3') having a fluid path (14) through which a fluid can be conveyed through the housing (1', 3'); a rotor (12) having a fluid path (11) through which a fluid can be conveyed through the rotor (12); a post (read on the extreme right end of rotor 12) having a fluid path (11) through which a fluid can be conveyed through the post; at least a first (7) and second (8)... bearing; positioning the post in the rotary union in a manner effective to help fluidly couple the rotor fluid path (11) and the housing fluid path (14) such that a fluid can be transferred between the housing (1', 3') and the rotor (12) via the post fluid path; rotatably coupling the rotor (12) to the housing (1', 3') such that an annular gap (23') surrounds at least a portion of the post, wherein rotatably coupling the rotor (12) to the housing (1', 3') comprises interposing the at least first (7) and second (8) ... bearings between a portion of the rotor (12) exterior and a portion of the housing (1', 3') interior in a manner such that the bearings (7 and 8) are spaced apart, wherein the annular gap (23') constitutes at least a

portion of a drain pathway (to drain port 26') through which a portion of fluid conveyed into the rotary union is drained from the rotary union" as recited.

Thus the patent to Miwa discloses all the claimed features with the exception of having an "unlubricated" bearing element.

The patent to Jen discloses that it is known in the art to employ unlubricated bearings 56, made of ceramic material, for the purpose of simplifying the system requirements by utilizing bearing elements that require no lubrication and thus will not fail upon lubrication failure. Additionally, any lubricant that would otherwise have entered the fluid conducted through the system simply because of its presence, will not now be a factor in utilizing unlubricated bearings as lubrication is not present.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Miwa unlubricated bearing elements for the purpose of utilizing bearing elements that require no lubrication and thus will not fail upon lubrication failure as recognized by Jen. Additionally, any lubricant that would otherwise have entered the fluid conducted through the system simply because of its presence, will not now be a factor in utilizing unlubricated bearings as lubrication is not present.

Regarding claim 21, in making and/or using the device of Miwa, as modified by Jen, one necessarily causes "a process fluid to be conveyed from a source of process fluid, through the rotary union, and to a rotating point of use, wherein during the entire time the process fluid is being conveyed to the rotating point of use a portion (e.g. that portion that leaks past gap 23') of the process fluid conveyed into the rotary union is continuously drained from the rotary union through the drain pathway (26') as recited.

Regarding applicants remarks filed May 2, 2007, as they may apply, the argument that the now claimed spaced apart bearings are not shown by the prior art is

responded to by the teaching in Miwa that the bearings 7 and 8 are in fact spaced apart by an unreferenced spacer element shown physically located between the bearings 7 and 8 of Miwa.

Additionally, concerning the reference to Jen, while the reference to Jen discloses only one bearing, and the device of Jen is disclosed as a turbine, this does not detract from the reference the clear teaching of a rotary union transferring fluid from a fixed member to a relatively rotating member, the relatively rotating members being separated and coupled by an unlubricated bearing which, being unlubricated requires no lubrication and thus will not fail upon lubrication failure and which is within the field of applicants endeavor.

Claims 3, 7, 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miwa et al (U. S. Pat. No. 5,058,927 of record) in view of Jen (U. S. Pat. No. 4,455,121 of record) as applied to claims 1, 5, 11-13, 16 and 21 above, further in view of Katsuhiko et al. (JP-11101250 cited by applicant).

The patent to Miwa, as modified by Jen, discloses all the claimed features including having "ball bearings made with material comprising ceramic material (taught by Jen)" but lacks having "and inner and outer races made with material comprising hardened stainless steel".

The document to Katsuhiko et al. discloses that it is known in the art to employ "ceramic" material balls 4 and "hardened stainless steel" bearing races at 2, 3 for the purpose of providing a ball bearing to reduce the occurrence of oscillation of an irrotational synchronous component, suppress the occurrence of fretting damage and to further reduce the generation of torque and the torque fluctuation.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Miwa, as modified by Jen, "hardened

stainless steel" material ball races, in place of the materials of the races of Miwa, as modified by Jen, for the purpose of providing a ball bearing to reduce the occurrence of oscillation of an irrotational synchronous component, suppress the occurrence of fretting damage and to further reduce the generation of torque and the torque fluctuation as recognized by Katsuhiko et al.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miwa et al (U. S. Pat. No. 5,058,927 of record) in view of Jen (U. S. Pat. No. 4,455,121 of record) as applied to claims 1, 5, 11-13, 16 and 21 above, further in view of Takeda (U.S. Pat. No. 5,203,592 cited by applicant).

The patent to Miwa, as modified by Jen, discloses all the claimed features with the exception of having "post exterior side region (having) one or more surface discontinuity". In Miwa "discontinuities" are located along the surface of the housing a annular grooves 22 forming the labyrinth seal.

The patent to Takeda discloses that it is known in the art to employ "surface discontinuities" at 25 in the valve body and 23 in the interiorly extending shaft for the purpose of forming a labyrinth seal at the juncture of the extending shaft and valve body precluding fluid leakage from the valve body.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Miwa, as modified by Jen, "surface discontinuities" along either the surface of the post or body where these parts overlap for the purpose of forming a labyrinth seal at the juncture of the extending shaft and valve body precluding fluid leakage from the valve body as recognized by Takeda.

Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miwa et al (U. S. Pat. No. 5,058,927 of record) in view of Jen (U. S. Pat. No. 4,455,121 of record) as applied to claims 1, 5, 11-13, 16 and 21 above, further in view

of known prior art as denoted at page 1 of the instant application, supplemented by common knowledge in the art as exemplified by Blalock et al. (U. S.; Pat. No. 6,095,159 cited herein).

It is noted that both method of use claims 22 and 23 merely set forth intended use of the "rotating point of use" as dependent from an apparatus claim.

The patent to Miwa, as modified by Jen discloses all the claimed features with the exception of having disclosed utility as either fluid supplying element in a semiconductor processing facility supplying fluid to a semiconductor processing chamber or a processing chamber in which a medical device is treated.

Firstly, as exemplified by the teaching at column 1, lines 13-15 of Blalock et al. it is well recognized in the plasma processing chamber art that plasma processing chambers are "used in a number of different industries (including) fabrication of integrated circuits , for coating medical devices and for coating mirrors". Given the disclosed prior art at page 1 of the instant specification, in which it is disclosed that it is common to use a rotary union "to facilitate the transfer of process liquid(s) from a first environment to a second environment" it would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ the device of Miwa, as modified by Jen in a plasma processing chamber environment utilized for either processing semiconductor integrated circuits or for coating medical devices.

Regarding applicants remaining arguments concerning the application of tertiary references to the above combination of Miwa and Jen, applicant merely points out that the addition of such tertiary references fails to illustrate the utilization of spaced unlubricated bearings. In response, these references are now not relied on nor were previously relied on for such teachings. As applied above, the reference to Miwa clearly teaches spaced apart bearings. The patent to Jen clearly teaches the desirability of

Art Unit: 3753

utilizing unlubricated bearings for the purpose of utilizing bearing elements that require no lubrication and thus will not fail upon lubrication failure. Additionally, any lubricant that would otherwise have entered the fluid conducted through the system simply because of its presence, will not now be a factor in utilizing unlubricated bearings as lubrication is not present.


Claim 24 is allowed.

Claims 25 and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Rivell whose telephone number is (571) 272-4918. The examiner can normally be reached on Mon.-Thur. from 6:30am-5:00pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eric Keasel can be reached on (571) 272-4929. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
**John Rivell**  
**Primary Examiner**  
**Art Unit 3753**

j.r.